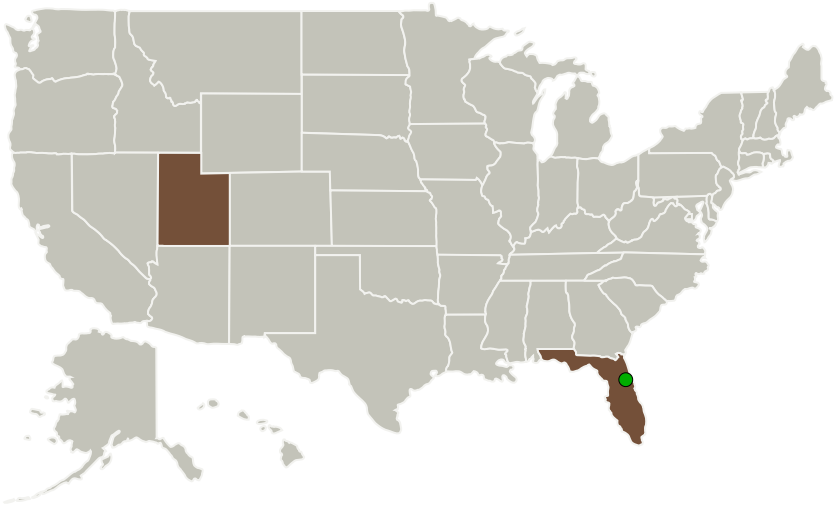
Three-Dimensional Backscatter X-Ray Imaging System, Phase I

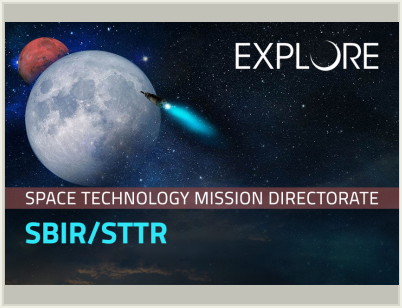
Completed Technology Project (2010 - 2011)

Project Introduction

The overall objective of the proposal is to design, develop and demonstrate a potentially portable Compton x-ray scatter 3D-imaging system by using specially designed rotationally movable x-ray source and x-ray detector, and the development of a suitable 3D-processing computer model. The proposed rotational configuration will allow the acquisition of multiple projections or images 360ºa around the region of interest, probing a conical volume of the object to be interrogated. The subsequent application of a computer model on these multiple projections, developed during Phase I, will allow a three-dimensional reconstruction of the object under study. In the proposed x-ray imaging system, the primary technical advance will be to extend methods that normally supplied a 2D projected image through a sheet of material, to a 3D image with more complicated features at different depths, such as cracks, corrosion, voids, delaminations, land mines, or improvised explosive devices. Also, the proposed system will be potentially portable, allowing it to be brought to the object to be imaged. The Beta and Production Phases of the proposed system would incorporate a battery self-contained package and wireless data transfer capabilities. These systems would revolutionize the current imaging applications that rely on 2D x-ray imaging systems only.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
ARIBEX	Lead Organization	Industry	Orem, Utah
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida
SCI Institute of the University of Utah	Supporting Organization	Academia	Salt Lake City, Utah

Primary U.S. Work Locations	
Florida	Utah

Project Transitions

January 2010: Project Start

January 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137347)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ARIBEX

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

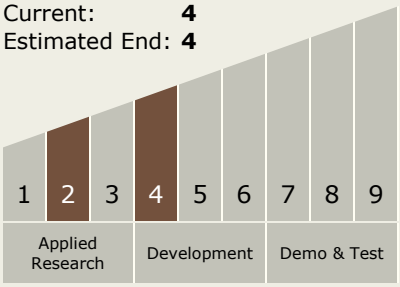
Carlos Torrez

Principal Investigator:

Clark Turner

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System